What is claimed is:

1. A process for analyzing a medical condition of a user comprising the following steps:

a) reading at least one signal from a user;

b) transforming said at least one signal into at least one digital signal;

c) extracting a plurality of parameters from said at least one digital signal;

d) analyzing said plurality of parameters and comparing said plurality of parameters to a range in a set of a plurality of preset parameters;

e) determining whether a user has an abnormal medical condition by determining whether said plurality of parameters fall outside of said range in said plurality of parameters; and

f) determining whether to trigger an alarm warning the user of his or her medical condition when said at least one of said plurality of parameters fall outside of said preset ranges for said preset parameters.

2. The process as in claim 1, further comprising the step of selecting a particular alarm from a set of a plurality of alarms for the user based upon which of said plurality of parameters fall outside of said range of said plurality of said preset parameters.

3. The process as in claim 1, wherein said step of extracting a plurality of parameters includes extracting a plurality of data points from said at least one digital signal and forming at least one QRS wave from said plurality of data points.

4. The process as in claim 1, wherein said step of determining whether a user has an abnormal medical condition includes the step of setting said range in said plurality of parameters based upon an average formed from a plurality of previous users.

5. The process as in claim 1, wherein said step of extracting a plurality of parameters comprises the following steps:

extracting at least two consecutive R-peaks from said digital signal;

analyzing noise in said digital signal between said at least two consecutive R-peaks found from said step of extracting R-peaks;

determining at least one significant R-R interval;

determining a plurality of pulse metric parameters; and

determining a plurality of characteristic points of a QRS complex.

6. The process as in claim 5, wherein said step of determining a plurality of pulse metric parameters includes determining:

a pulse rate;

a plurality of premature beats; and

an atrial fibrillation flutter.

7. The process as in claim 5, wherein said step of determining a plurality of characteristic points of a QRS complex includes the steps of:

determining a plurality of dominant characteristic points;

determining a plurality of auxiliary characteristic points; and

determining a plurality of QRS complex parameters.

8. The process as in claim 7, wherein said step of determining a plurality of dominant characteristic points includes determining points Q, R, S, J, P and T on a QRS complex.

9. The process as in claim 7, wherein said step of smoothing ECG waves using cubic spline approximation.

10. The process as in claim 7, wherein said step of determining a plurality of auxiliary characteristic points includes determining points I, K, Pl, P2 T1, and T2.

11. The process as in claim 7, wherein said step of determining a plurality of QRS complex parameters includes:

calculating a ST-segment depression/elevation;

a width of a Q-wave (WQ);

an amplitude of the Q-wave;

a width of QRS complex;

a width of PQ interval;

a width of QT interval;

an amplitude of R wave;

T wave inversion; and

Ratio of amplitude of Q wave to amplitude of R wave.

12. The process as in claim 6, wherein said step of extracting R peak–from said digital signal forming a QRS fragment includes using the following formula:

$(V-V1)>A1$

$(V-V2)>A2$

wherein V is the amplitude at a current point along the QRS fragment;
V1 is the amplitude at (t-d1)
V2 is the amplitude at point (t-d2)
wherein t is the current time and d1, d2, A1, and A2 are empiric constants.

13. The process as in claim 5, wherein said step of determining an R-R interval involves determination at least 2 consecutive significant R-peaks.

14. The process as in claim 5, wherein said step of filtering noise involves filtering out bioelectrical signals generated by skeletal muscle activity and excluding R-R intervals when noise exceeds predefined level excluding R-R intervals with noise level N exceeding predefined level. This may include a visual representation of the relative noise level.

Believing N=0, then:

for each given point j from interval $[R_{i-2}+e_1, R_i-e_1]$:

if $|(V_j-V_{j-1})>2^m$ and $|(V_j-V_{j+1})>2^m$,

then $N=N+2^m$, $m=3 \ldots 0$, $j \in [R_{i-2}+e_1, R_i-e_1]$

for each given point j from interval $[R_{i-2}+e_2, R_i-e_2]$:

if $(V_j-V_{j-1})>m$ and $(V_j-V_{j+1})>m$,

then $N=N+m$, $m=30, 20$, $j \in [R_{i-2}+e_2, R_i-e_2]$

where:

e_1, e_2–indentations from threshold points (threshold point are empiric values equal 75 ms and 115 ms correspondently);

V_j–amplitude in point j;

N–noise level value.

15. The process as in claim 6, wherein said step of determining a pulse rate is calculated using a running average value of a plurality of R-R intervals.

16. The process as in claim 15, wherein said step of determining a pulse rate includes using a running average value of four R-R intervals.

17. The process as in claim 6, wherein said step of determining premature beats includes using the following formula:

(RR/RRn)=0.7

whereby RR is the current R-R interval; and

RRn is the "normal" R-R interval.

18. The process as in claim 6, wherein said step of determining said atrial fibrillation flutter includes using the following formula:

F=(F1+F2)/X%

wherein

Fl is an extrasystole component;

F2 is a variability component;

X is a dynamically calculated value.

19. The process as in claim 1, further comprising the step of determining whether to send a signal to the user to administer a form of external stimuli.

20. The process as in claim 19, wherein said external stimuli is in the form of a medicine injection.

21. A process for analyzing a medical condition of a user by using a portable information device having a plurality of sensors, at least one digital to analog converter and at least one transceiver and by using an information processing device having at least one medical information analyzer, at least one data store, at (least one parameter analyzer, at least one abnormality identifier and at least one alarm controller wherein the process comprises the following steps:

a) reading at least one signal from the plurality of-sensors attached to the user;

b) transferring said at least one signal from said plurality of sensors into at least one digital signal using the digital to analog converter;

c) extracting a plurality of parameters from said at least one digital signal using the medical information analyzer;

d) analyzing said plurality of parameters and comparing said plurality of parameters to a range in a set of preset parameters stored in the data store, by using the parameter analyzer;

e) determining whether a user has an abnormal medical condition by determining whether said plurality of parameters fall outside of said range in said plurality of preset parameters by using the abnormality identifier; and

f) determining whether to trigger an alarm warning the user of his or her medical condition when said at least one of said plurality of parameters fall outside of said preset ranges for said preset parameters by using the abnormality identifier in conjunction with the alarm controller.

22. The process as in claim 21, further comprising the step of using the alarm controller to select a particular alarm from a set of a plurality of alarms, stored in the at least one data store, for the user based upon which of said plurality of parameters fall outside of said range of said plurality of said preset parameters.

23. The process as in claim 21, further comprising the step of using the alarm controller to select a particular alarm from a set of a plurality of alarms stored in the at least one for the user based upon which of said plurality of parameters fall outside of said range of said plurality of said preset parameters.

24. The process as in claim 21, further comprising the step of determining whether to send a signal to the user to administer a form of external stimuli.

25. The process as in claim 24, wherein said external stimuli is in the form of a medicine injection.

26. A process for analyzing a medical condition of a user comprising the following steps:

reading at least one signal from a user;

transferring said at least one signal into at least one digital signal;

extracting a plurality of parameters from said at least one digital signal, wherein said plurality of parameters are selected from a group consisting of: pulse rate, intermediate alteration of a pulse rate, R-R interval, premature beats, group of premature beats, an atrial fibrillation flutter, ST-segment depression/elevation, T-wave inversion, width of Q-wave, Ratio of Amplitude of Q-wave to amplitude of R-wave, amplitude of R-wave, width of QT-interval, width of QRS complex, width of PQ-interval, Standard deviation of the average normal-to-normal R-R intervals;

analyzing said plurality of parameters and comparing said plurality of parameters to a range in a set of preset parameters;

determining whether a user has an abnormal medical condition by determining whether said plurality of parameters fall outside of said range in said plurality of parameters; and

determining whether to trigger an alarm warning the user of his or her medical condition when said at least one of said plurality of parameters fall outside of said preset ranges for said preset parameters.

27. The process as in claim 26, wherein said step of determining whether a user has an abnormal condition includes determining at least one abnormal condition selected from the group consisting of: sick sinus node syndrome, slow ventricular rhythm, AV block II-III degree, paroxysm, tachycardia, sudden heart block, sinus arrest, cardiac arrest, extrasystoles, group extrasystoles, paroxysm of atrial fibrillation flutter, myocardial ischemia, myocardial infarction, bundle branch blocks, ventricular tachyarrhythmia.

28. A process for analyzing a medical condition of a user comprising the following steps:

reading at least one signal from a user;

transferring said at least one signal into at least one digital signal;

extracting a plurality of parameters from said at least one digital signal;

analyzing said plurality of parameters and comparing said plurality of parameters to a range in a set of preset parameters;

predicting a possibility of a future occurrence of an abnormal medical condition in the user using at least one of said plurality of parameters;

determining whether a user has an abnormal medical condition by determining whether said plurality of parameters fall outside-of said range in said plurality of parameters and determining whether to trigger an alarm warning the user of his or her medical condition or possible future medical condition when said at least one of said plurality of parameters fall outside of said preset ranges for said preset parameters.

29. The process as in claim 28, wherein said abnormal medical condition is a development of myocardial infarction or sudden cardiac death.

30. The process as in claim 28, wherein said step of predicting a possibility of a future occurrence of an abnormal medical condition includes using at least one of the following parameters: heart beats per minute of the user; ST init. which is the ST segment level before observation beginning, ST meas. which is the ST segment level at the current movement, ST thresh.–which is the ST segment threshold at normal levels, QT meas.–which is the QT interval duration at the current moment; QT norm. which is the QT interval normal duration.

31. The process as in claim 30, wherein said step of predicting a-possibility of a future occurrence of an abnormal medical condition includes using the following formula:

$$RR = 1 + \sqrt{K_1 * \left|\frac{STmeas - STinit}{STinit. + STthresh.}\right|^2 + \left|\frac{QTmeas.}{QTnorm.} - 1\right|^2 + \left|\frac{N_1 + K_2 * N_2 + K_3 * N_3}{HR}\right|^2}$$

Wherein

K_1 is a first constant;

K_2 is a second constant; and

K_3 is a third constant.

32. The process as in claim 31, further comprising the step of adjusting constants K_1, K_2 and K_3 depending upon a set of clinical data obtained by predicting said abnormal medical condition, so that as more experiments and trials are performed, said constants may be modified to provide more accurate forecasting.

33. The process as in claim 31, wherein initial values of said constants: kl is approximately 1.49, k2 is approximately 34.91, and k3 is approximately 73.68.

34. The process as in claim 28, further comprising the step of setting a range for said at least one parameter to predict said future occurrence of said abnormal medical condition.

35. The process as in claim 28, further comprising the steps of inputting the user's medical history into a database and storing said user's medical history.

36. The process as in claim 34, further comprising the step of adjusting said range for said at least one parameter using at least one level of adaptability.

37. The process as in claim 34, further comprising the step of adjusting said range for said at least one parameter using a first level, a second level and a third level of adaptability.

38. The process as in claim 35, wherein said first level of adaptability includes adjusting said range based upon at least one of the following user's characteristics: age, gender, weight, or medical history.

39. The process as in claim 37, wherein said second level includes adjusting said range based upon a log file of cardiac events wherein said adjustment is actuated by a person controlling the setting of the range.

40. The process as in claim 37, wherein said third level includes automatically adjusting said range.

41. An article of manufacture comprising:

a) a computer usable medium having a machine-readable program code means for reading at least one signal from a user;

b) a machine-readable program code means for transferring said at least one signal into at least one digital signal;

c) a machine-readable program code means for extracting a plurality of parameters from said at least one digital signal;

d) a machine-readable program code means for analyzing said plurality of parameters and comparing said plurality of parameters to a range in a set of preset parameters;

e) a machine-readable program code means for predicting a possibility of a future occurrence of an abnormal medical condition in the user using at least one of said plurality of parameters;

f) a machine readable program code means for determining whether a user has an abnormal medical condition by determining whether said plurality of parameters fall outside of said range in said plurality of parameters; and

g) a machine readable program code means for determining whether to trigger an alarm warning the user of his or her medical condition or a possible future medical condition when said at least one of said plurality of parameters fall outside of said preset ranges for said preset parameters.

42. A device for analyzing a medical condition of a user comprising:

a) at least one portable information device comprising:

i) at least one sensor coupled to the user wherein said sensor reads at least one signal from said user;

ii) at least one analog to digital (A/D) converter in communication with said at least one sensor, said at

least one (A/D) converter for converting said at least one signal into a digital signal;

iii) at least one GPS system for determining a location of the user,

iv) at least one transceiver coupled to said at least one analog to digital converter and said at least one GPS system wherein said transceiver can send and receive signals including sending said at least one digital signal and information about the location of the user;

b) at least one information processing device comprising:

i) at least one transceiver for receiving information from said at least one portable information device;

ii) at least one processor coupled to said transceiver said at least one processor for analyzing said at least one signal;

iii) at least one data store coupled to said processor, said at least one data store for storing data from said at least one processor;

wherein said at least one processor analyzes medical information about said user and then determines whether a user either has a medical abnormality or will have a future occurrence of a medical abnormality.

43. The device as in claim 42, wherein said at least one information processing device further comprises at least one buffer for receiving information from said at least one portable information device.

44. The device as in claim 43, further comprising at least one additional buffer.

45. The device as in claim 44, wherein said at least one buffer is a FIFO buffer.

46. The device as in claim 44, wherein said at least one additional buffer is a C buffer.

47. The device as in claim 42, further comprising an information storage device in communication with said at least one information-processing device.

48. The device as in claim 42, wherein said at least one processor comprises at least of the following elements: a medical information analyzer, a parameter analyzer an abnormality identifier, an alarm controller and a commutator.

49. A device for analyzing a medical condition of a user comprising:

a) at least one portable information device comprising:

i) at least one sensor coupled to the user wherein said sensor reads at least one signal from said user;

ii) at least one analog to digital converter coupled to said at least one sensor for converting said at least one signal from said at least one from analog to digital;

b) at least one information processing device comprising:

i) at least one processor for analyzing said at least one signal wherein said at least one processor analyzes medical information about said user and then determines whether a user either has a medical abnormality or will have a future occurrence of a medical abnormality;

ii) at least one data store coupled to said processor, said at least one data store for storing data from said at least one processor;

iii) at least one (GPS) system coupled to said at least one processor, said at least one (GPS) system for determining a position of a user;

iv) at least one transceiver coupled to said at least one processor, said at least one transceiver for sending and receiving at least one signal from said at least one information processing device; and

c) at least one communication line coupling said at least one portable-information device to said at least one information-processing device.

50. A process for constructing a QRS wave from an ECG signal comprising the steps of:

detecting a first R-peak from the ECG signal;

detecting at least a second R-peak from the ECG signal;

determining an R-R interval from said first and said at least a second R-peak;

calculating a plurality of characteristic points by interpreting a position for each of said characteristic points based upon said R-R interval and said first and said second R-peak; and

calculating a plurality of auxiliary characteristic points based upon the calculation of said characteristic points.

51. The process as in claim 50, further comprising the step of filtering and smoothing said QRS wave once said characteristic points have been calculated.

52. The process as in claim 50, further comprising the step of calculating an isoline for the QRS wave after said plurality of auxiliary characteristic points have been calculated.